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ABSTRACT

The percentage of high school students passing the first semester Algebra 1A final exam in January 2000 dropped precipitously from the passing rate one year earlier. That decline in final exam passing rates was due largely to the adoption among all schools of a uniform algebra exam combined with a system-wide uniform grading scale. High school differences in Algebra 1A exam performance were reported to the Board of Education on May 9, 2000. As part of a continuing analysis, the current report summarizes the connections between Algebra 1A exam performance and: (1) teachers' education levels; (2) years of teaching experience; (3) certification for math instruction, and (4) completion of pertinent in-service training courses. (ASK)

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Office of Shared Accountability
Montgomery County Public Schools
Rockville, Maryland

The Role of Teacher Background and Preparation in Students' Algebra Success

John C. Larson, Ph.D.

September, 2000

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The Role of Teacher Background and Preparation in Students' Algebra Success

REPORT SUMARY

The percentage of high school students passing the first semester Algebra 1A final exam in January 2000 dropped precipitously from the passing rate one year earlier. That decline in final exam passing rates was due largely to the adoption among all schools of a uniform algebra exam combined with a system-wide uniform grading scale. High school differences in Algebra 1A exam performance were reported to the Board of Education on May 9, 2000. As part of a continuing analysis, the current report summarizes the connections between Algebra 1A exam performance and: (1) teachers' education levels; (2) years of teaching experience; (3) certification for math instruction, and (4) completion of pertinent in-service training courses.

Overview of findings

What teachers do with instruction in the classroom is more important to student learning than who they are according to their credentials.

The current analysis suggests that some schools and some teachers are more effective than others in Algebra 1A instruction. However, this analysis does not succeed in identifying the school or teacher attributes that distinguish more effective from less effective schools and teachers. The effectiveness on Algebra 1A exam performance of ninth grade instruction, when distinguished from the effects of students' eighth grade preparation levels, proved unrelated in any systematic way to teachers' education levels, years of teaching experience, certification in math, or completion of in-service math training courses. This means, for example, that teachers with BA degrees were not significantly more nor less effective in algebra instruction than were teachers with higher levels of education.

Almost all teachers of Algebra 1A for students in the regular program were certified to teach math.

Among the 185 teachers of Algebra 1A studied in the 23 high schools, 87 percent were certified to teach math. Among the 22 non-math-certified teachers, 16 were certified in special education and taught largely special education students. With those 16 teachers separated from the rest, the math certification rate of the remaining 169 teachers who taught mainly regular students in the 23 high schools was 95 percent math-certified. Since so few teachers in the regular program were not math-certified, this analysis should not be interpreted to mean that certification is irrelevant. An appropriate test of such an assertion would require a large sample of non-certified teachers in classrooms otherwise equivalent to those of certified teachers.

MCPS teachers of Algebra 1A are more highly educated than teachers state-wide.

Over three-fourths (77 percent) of the Algebra 1A teachers in the 23 high schools had education levels at or beyond the masters' degree level. In the state of Maryland, two-thirds of teachers have that level of education (The Fact Book 1998-1999, MSDE). Just over one-fourth of the Algebra 1A teachers (28 percent) had three years or less of teaching experience, and just over one-third (35 percent) had over 15 years of teaching experience.

BACKGROUND

This report builds upon the findings of an earlier report to the Board of Education (May 9, 2000) concerning the high school student performance levels in Algebra 1A. That report reached several conclusions about student and school factors related to performance on the Algebra 1A final exam.

- **Pre-high school preparation for algebra in Grade 9 is crucial for algebra performance.** Student preparation in math, as evidenced by Criterion Referenced Test (CRT) scores in math from eighth grade, provides an important signal of students' likelihood for success in passing the Algebra 1A final exam. For example, about 20 percent of the students with an eighth grade CRT score of 600 passed the exam while about 52 percent of the students with an eighth grade CRT score of 650 passed the exam (see Attachment 1).

- **Some racial/ethnic group differences in algebra performance persist even among students with the same pre-high school preparation levels.** The passing rate on the Algebra 1A exam for White and Asian students (about 50 percent) was close to 25 percentage points higher, on average, than that of the African American and Hispanic students. Some of that difference was due to corresponding racial/ethnic group differences in eighth grade math preparation. Nevertheless, the passing rates of those racial/ethnic groups still differed by about 10 to 15 percentage points even among students who shared the same levels of eighth grade math preparation. (See Attachment 2)

- **The new Algebra 1A exam appears valid**. The new, more stringent grading scale on the system-wide final exam provides a more valid indicator of students' likelihood for success two years later in Algebra 2, and a more sensitive "early warning" indicator of potential difficulties, than was the case for the school-by-school grading practices in January 1999. This means that many students who would have passed the Algebra 1A exam under the former guidelines but failed under the new guidelines would most likely have had difficulty in the Algebra 2 course in eleventh grade.

- **Students failing algebra tend also to fail in other courses.** Many students who failed the Algebra 1A exam tended to have more academic difficulties than just in their math course, because about half of the ninth graders who failed the exam also failed at least one other final exam in academic courses. This finding suggests that programs for student support should go beyond just mathematics subject matter to include counseling and support in broader study skills and motivation.

- **Some high schools were more effective than others in Algebra 1A instruction.** High schools differed considerably in their Algebra 1A exam passing rates among ninth graders, and much, but not all, of those differences corresponded to the schools' differences in students' eighth grade math preparation levels. Nevertheless, the exam passing rates among some schools that had similar levels of eighth grade math scores differed by as much as 30 to 40 percentage points (see Table 3). This finding suggests that some schools have more effective practices than do others in teaching algebra to the same kinds of students.

The foregoing findings pertain to about half (48 percent) of the ninth grade cohort, because one-third of the ninth graders were enrolled in math courses above the level of Algebra 1A while about one-fifth (19 percent) of the ninth graders were enrolled in math courses below the level of algebra.

The differences in exam passing rates among high schools with similar levels of student math preparation from eighth grade suggest where to look for effective instructional strategies. This report took one step toward narrowing that search by focusing on differences among teachers in the Algebra 1A final exam performance of their students. We reasoned that teachers with more years of teaching experience would prove more effective in algebra instruction. Similarly, teachers with higher levels of education, or with certification in math instruction or with completion of specific training courses in math instruction would prove more effective than would other teachers not so qualified. We gauged teacher effectiveness by comparing their ninth grade students' average final exam marks among students who had similar math scores from eighth grade. This procedure enabled us to distinguish the effectiveness of the ninth grade algebra teacher from other effects on students' performance that preceded the Algebra 1A course.

DETAILED FINDINGS

Teacher Preparation Profiles

The profiles of Algebra 1A teachers in Table 1 show that levels of staff education, experience and certification are quite high among the 23 high schools. For example, 77 percent of the Algebra 1A teachers had educational levels at least as high as a master's degree.[1]

The level of certification for math instruction was 87 percent among the Algebra 1A teachers. A recent national survey revealed that 88 percent of high school math teachers were certified to teach math.[2] Among the teachers in Table 1 not certified to teach math, 16 had case-loads comprised of more than 50 percent special education students (who received 15 or more hours of service per week). When those teachers were subtracted from the total, the certification rate among the remaining 169 teachers was 95 percent. Among the non-math-certified teachers, about three-fourth (73 percent) were certified in special education, and about 88 percent had master's degrees or higher levels of attainment. Those 22 non-math-certified teachers were dispersed across 17 high schools (see Attachment 3).

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[1] Of the 185 teachers included in Table 1, the number of teachers for whom education and experience levels could be matched was 175 teachers. Percentages based on that group are used as estimates in Table 1. Table 1 excluded teachers whose case-load of students was less than 10 under the assumption that such groups did not represent the typical Algebra 1A instruction.

[2] Blank, Rolf K and Langesen, Doreen, (1999) State Indicators of Science and Math Education, 1999. Council of Chief State School Officers: Washington D.C., p. 63. That survey presented data from 32 states.

Table 1
Student Algebra 1A Performance and Background Levels Among Teachers With Different Profiles of Preparation

		TEACHERS		Gd.9 Exam Pass Rate	Gd.9 Course Pass Rate	Gd.8 CRT Math	Ever FARMS
		Count	% of Group	Mean	Mean	Mean	Mean
Educ. Level	BA	39	22%	40%	80%	627	33%
	MA	88	50%	37%	79%	615	39%
	MA+ or PhD	48	27%	38%	75%	625	37%
Math Certification	NO	22	13%	22%	70%	579	53%
	YES	153	87%	40%	79%	626	35%
Years Teaching	1	23	13%	32%	76%	618	37%
	2-3	27	15%	40%	75%	621	38%
	3-4	22	13%	40%	81%	623	37%
	6-9	26	15%	39%	75%	626	35%
	10-15	16	9%	32%	79%	608	41%
	16-24	27	15%	39%	80%	610	43%
	25 - +	34	19%	41%	81%	628	31%
In-service Courses MA65 or MA66	Neither Course	157	85%	39%	79%	621	37%
	1 or Both Courses	28	15%	31%	77%	614	42%
TOTAL		185	100%	38%	79%	620	37%

Data Include Teachers With Case-loads of At Least 10 Students; Algebra 1A, January 2000

Relatively few of the Algebra 1A teachers (15 percent) had completed one or both of the in-service training courses Math-65 or Math-66.

Some surveys have reported that schools with higher percentages of students at near-poverty levels tend to have new teachers with less experience. However, Table 1 shows that, among first-year teachers, the percentages of students who had ever received FARMS (37 percent) was the same as that for the overall group.

Attachment 5 provides detailed listings of the levels of preparation and background for the Algebra 1A teachers in each of the 23 regular high schools.

Teachers with more years of experience did not necessarily have classrooms with higher scoring students. For example, Table 1 shows that the teacher groups with between 10 and 24 years of experience had math score averages in their classes that were lower than the classroom averages among teachers with less than 10 years of experience. Also, teachers with just BA degrees had the same average student scores among their classes as did teachers with Ph.D. degrees.

Many students with low math scores were served by teachers certified in the area of special education. Those teachers accounted for 14 of the 22 teachers in the "no math certification" group shown in Table 1.

Table 1 also shows the average final exam passing rates for the various teacher profile groups. However, those differences do not indicate teacher effectiveness among the profile groups. Differences among teacher groups in their students' exam passing rates do not indicate teacher effectiveness because those groups also differ in their respective

student preparation levels from grade 8. Recall from Attachment 1 that the higher a student's grade 8 math score, the higher the student's likelihood for success on the Algebra 1A exam. For example, Attachment 1 shows that among all ninth grade Algebra 1A students with grade 8 CRT scores near 650, the likelihood of passing the Algebra 1A exam was just over 50 percent while the likelihood of passing the Algebra 1A exam was just over 80 percent among students with grade 8 CRT scores of 700. Further analysis was needed in order to compare the final exam marks of the various teacher profile groups among students' with the same levels of math preparation levels from grade 8.

Relative Instructional Effectiveness of Different Teacher Groups

Teachers with few years of experience were no more nor any less likely than were teachers with many years of experience to produce higher Algebra 1A exam marks when working with students of the same math preparation levels. Similarly, teachers with advanced graduate degrees were not significantly more effective than were teachers with only bachelor's degrees in producing higher Algebra 1A marks when working with students who had similar eighth grade math scores. Analysis of the minor variations in the "Residual for Exam Marks" column of Table 2 revealed no statistically significant differences in instructional effectiveness across teacher profile groups.

Table 2
Comparisons of Relative Instructional Effectiveness (RESIDUAL)
Among Various Teacher Profile Groups

		TEACHERS		Ever FARMS	Gd.8 CRT Math	Gd.9 Exam Pass Rate	Final Exam Mark	RESIDUAL for Exam Mark
		Count	% of Group	Mean	Mean	Mean	Mean	Mean
Educ. Level	BA	32	25%	30%	636	44%	.74	-.06
	MA	60	46%	36%	630	44%	.71	.01
	MA+ or PhD	38	29%	31%	639	46%	.86	.05
Math Certification	NO	4	3%	36%	634	33%	.64	-.10
	YES	126	97%	33%	634	45%	.77	.01
Years Teaching	1	17	13%	33%	633	37%	.62	-.13
	2-3	20	15%	35%	635	49%	.85	.06
	3-4	16	12%	31%	637	47%	.83	.03
	6-9	23	18%	34%	632	44%	.71	-.02
	10-15	12	9%	41%	618	32%	.44	-.15
	16-24	16	12%	37%	636	46%	.83	.06
	25 - +	26	20%	27%	640	48%	.91	.11
In-service Courses MA65 or MA66	Neither Course	112	82%	31%	638	46%	.80	.00
	1 or Both Courses	25	18%	41%	619	34%	.54	-.07
TOTAL		137	100%	33%	634	44%	.75	-.01

Data include teachers with Grade 8 and 9 information on at least 10 students: Algebra 1A, January 2000

The "Residual for Exam Marks" in Table 2 represents the teacher effectiveness. Teacher effectiveness in algebra instruction was determined by the following procedure. The indicator of relative instructional effectiveness for teachers was compiled from analyses of student performance that examined both the CRT math scores from eighth grade and the grade attained on the Algebra 1A final exam in ninth grade. In essence, the exam grade for each student was compared to the average exam grade of all other students who had the same eighth grade CRT score. If a student had an exam grade

significantly higher than the average of all other students with the same CRT score from eighth grade, we conclude that such a student experienced more effective instruction. Conversely, if another student had an Algebra 1A exam grade significantly lower than the average exam grade of all other students with the same eighth grade score, we conclude that such a student experienced relatively less effective instruction than the "average instruction" among other students with similar math scores from eighth grade.

The difference between the student's actual Algebra 1A exam grade and the average exam grade of all other students with the same eighth grade math scores is called the "residual". (The term "residual" refers to a student's "left-over" portion on the exam after the average exam grade of all other students' with the same eighth grade math score is subtracted from each student's own exam grade.) Note that the residual score is zero-sum. That is, some students must necessarily be above the average residual, and some students must be below the average residual. Based in this definition, the average residual among the total group of students is zero. For this reason, the residual scores paint a picture of a student's standing relative to an average. The pertinent question discussed below is: To what extent do students with unusually high or unusually low residuals tend to be served by certain schools or certain teachers?

The teacher's instructional effectiveness in Algebra 1A, shown in Table 2 in the "Residuals" column, was compiled as the average of the student residual exam grades among all students served by the teacher.

Note that not all Algebra 1A teachers were used in the analysis summarized in Table 2. This is due to several conditions. First, as noted above several teachers on the report card system from which exam grades were taken did not have data available on the staff background data file. Second, not all grade 9 Algebra 1A students had math scores from eighth grade in the prior year. Third, only teachers with at least 10 students who had both eighth grade math scores and ninth grade Algebra 1A exam marks were included in the analysis. This step was taken to avoid excessive statistical unreliability among teachers with small case-loads of students.

Relative Instructional Effectiveness of Schools.

The school's instructional effectiveness in Algebra 1A was compiled as the school's average of the student residual exam grades among all students served by the school. This indicator is listed below in Table 3 as the "Residual Exam Mark" column, along with other summary data for each high school. In Table 3 the schools are listed from highest to lowest instructional effectiveness. The four schools highest in effectiveness were (in order): Paint Branch, Churchill, Poolesville, and Wootton. The four schools lowest in effectiveness were: Sherwood, Blake, Seneca Valley, and Wheaton.

It is important to distinguish the schools **proficiency** standing in Algebra 1A (i.e. "Grade 9 Exam Pass Rate" in Table 3) from the school's **productivity** in algebra instruction (i.e. the "Residual" standing in Table 3). High schools working with students better-prepared in math from middle school tend to produce higher Algebra 1A exam passing rates than do high schools working with less-prepared students. However, some schools produced higher exam passing rates than did other schools working with students of essentially the same level of pre-high school math preparation. For example, note in Attachment 1 that the average exam passing rate among students with a CRT score of 630 from eighth grade was about 42 percent. However, among the six schools whose students

averaged close to 630 on the eighth grade CRT, the ninth grade passing rate on the Algebra 1A exam ranged from a low of 26 percent to a high of 66 percent (see Figure 1 below, plotted from the data in Table 3).

Given the foregoing discussion on the meaning of "residual scores" and instructional effectiveness, it is possible that a certain "School A" may show higher productivity than a certain "School B" even though School B may show a higher exam passing rate than School A. For example, the listing in Table 3 shows that Paint Branch High School has a higher residual, or productivity standing, than does Whitman High School, even though the latter has higher Algebra 1A exam passing rates than does Paint Branch. Schools high in instructional productivity and working with only moderately-prepared students, such as Paint Branch or Poolesville, should be examined for their active ingredients to algebra instruction.

Figure 1.
Some Schools Vary Considerably in Instructional Effectiveness
Among Students with Similar Levels of Math Preparation.

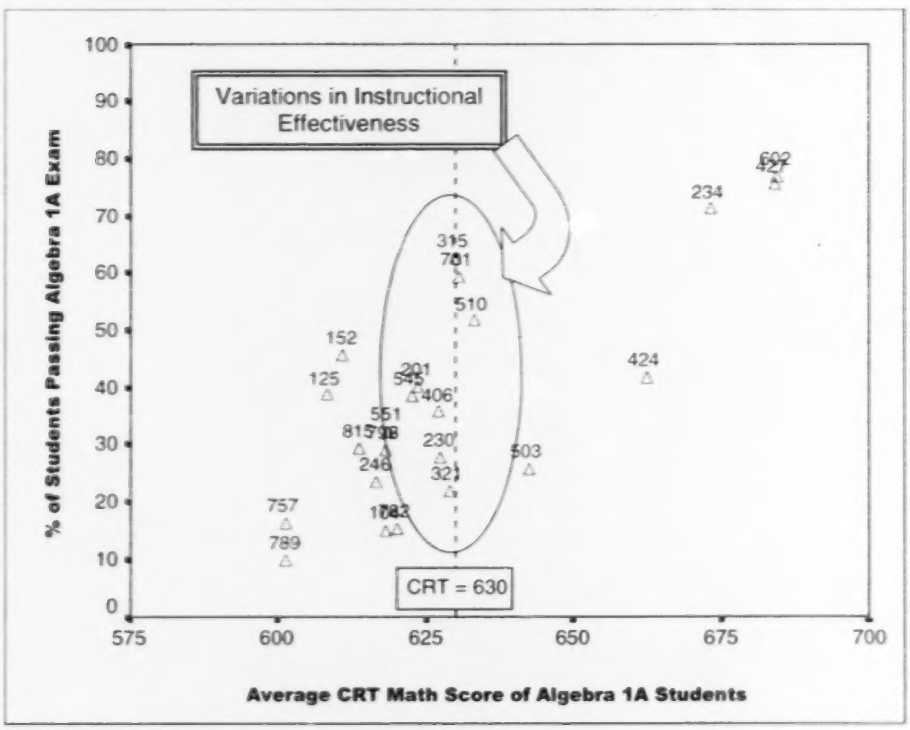

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Table 3
Descriptive Information on Algebra 1A Students in 23 High Schools, January 2000
(In Descending Order of Algebra Instructional Effectiveness)

SCHOOL	School Code	No. of All Alg. Students	No. of Alg. Teachers	Teacher's Avg. Case-Load	% Alg. Students in Gd. 9	No. of Gd.9 Alg. Students	% Ever FARMS	Avg. Gd.8 CRT Math	Gd.9 Exam Pass Rate	Avg. RESIDUAL for Exam Mark
PAINT BRANCH HS	315	230	4	57.5	82%	188	24%	630	66%	.94
CHURCHILL HS	602	244	6	40.7	93%	224	9%	685	81%	.60
POOLESVILLE HS	152	117	4	29.3	72%	83	17%	611	59%	.51
WOOTTON HS	234	241	8	30.1	89%	210	13%	673	76%	.30
WHITMAN HS	427	228	8	28.5	91%	207	4%	684	80%	.26
QUINCE ORCHARD HS	125	264	7	37.7	73%	191	35%	608	46%	.22
DAMASCUS HS	701	358	11	32.5	81%	288	16%	631	63%	.21
MAGRUDER HS	510	305	8	38.1	74%	222	34%	633	59%	.17
GAITHERSBURG HS	551	364	10	36.4	65%	231	50%	619	41%	.00
KENNEDY HS	815	285	6	47.5	77%	213	48%	614	32%	-.01
R. MONTGOMERY HS	201	277	7	39.6	58%	159	38%	624	54%	-.03
SPRINGBROOK HS	798	377	10	37.7	81%	294	47%	618	30%	-.10
B.C.C. HS	406	199	5	39.8	69%	137	36%	627	43%	-.11
WATKINS MILL HS	545	332	6	55.3	73%	241	47%	623	41%	-.15
M. BLAIR HS	757	464	13	35.7	59%	272	53%	601	23%	-.18
NORTHWEST HS	246	233	4	58.3	76%	174	40%	617	29%	-.26
EINSTEIN HS	789	287	8	35.9	68%	193	51%	601	13%	-.27
WALTER JOHNSON HS	424	220	5	44.0	86%	186	20%	662	47%	-.30
ROCKVILLE HS	230	225	7	32.1	80%	177	41%	628	33%	-.33
WHEATON HS	782	314	9	34.9	78%	245	62%	620	19%	-.35
SENECA VALLEY HS	104	288	8	36.0	73%	208	38%	618	16%	-.38
J. HUBERT BLAKE HS	321	287	7	41.0	81%	232	28%	629	26%	-.40
SHERWOOD HS	503	335	8	41.9	79%	256	16%	642	31%	-.46
SUMMARY		6474	169	39.6	76%	4831	33%	630	44%	.00

NOTES: The "Teacher's Avg. Case-load" is the number of all Algebra 1A students divided by the number of teachers. Very small algebra sections (less than 10 students) and sections with more than 50 percent special education students have been excluded. The last three columns summarize data only for grade 9 students. The "Avg. RESIDUAL" represents the relative effectiveness of the school's Algebra 1A instruction (see definition above in text).

Implications and Recommendations

The current analysis suggests that some schools and some teachers are more effective than others in Algebra 1A instruction. However, this analysis does not succeed in identifying the school or teacher attributes that distinguish more effective from less effective schools and teachers.

Among all ninth grade students in Algebra 1A, on average, the students with higher CRT math scores from grade 8 tend to do better on the Algebra 1A final exam than do students with lower CRT scores. For example, on average, only about 20 percent of the students with eighth grade CRT math scores below 600 passed the Algebra 1A exam in ninth grade. Therefore, the math program from kindergarten through eighth grade provides a crucial preparation for algebra success in ninth grade. Further studies will examine the effect on math preparation of the students' sequences of specific courses in middle school.

However, some high schools clearly provide more effective instruction than do others. Demographic factors and student pre-high school math preparation levels alone cannot explain such disparities. Organizational and instructional features in the effective schools should be examined and emulated elsewhere.

Some organizational features have been addressed in the recent past. For example, all high schools have implemented double-period algebra instruction for some of the lower-scoring students, and the size of the algebra classes has been reduced in the past two years to a maximum of 20 students per class. These features alone appear not to have enhanced algebra performance among ninth graders. Concentrating the algebra instruction among a smaller cadre of teachers in the school rather than dispersing the instruction among many teachers may not, in itself, yield more effective instruction. For example, even though the most effective school (in Attachment 3) had a high case-load of students per teacher (reflecting a concentration of Algebra 1A classes among few teachers), two other schools with a similar case-load were far lower in instructional effectiveness. Also, the schools ranked third, fourth, and fifth in instructional effectiveness had the lowest case-loads of students per teacher.

The lack of significant associations between teachers' training and preparation levels and their effectiveness in algebra instruction remains puzzling. Most of the teachers of Algebra 1A students have high levels of academic credentials, and nearly 9 out of 10 of them are certified to teach math. The search for best classroom practices in algebra instruction may be most fruitfully pursued by conducting observations within the classrooms of teachers whose effectiveness indicators are relatively high and, further, by identifying the structural and contextual school conditions that support successful teachers.

The findings thus far suggest that, among the relatively highly-qualified teaching staff in MCPS high schools, what teachers **do** in the classroom is more important to student learning than who they **are**.

The Role of Teacher Background and Preparation in Students' Algebra Success

ATTACHMENTS

ATTACHMENT 1
The Likelihood for Students To Pass the Algebra 1A Exam in Grade 9 is Closely Related To Students' Math Performance in Grade 8

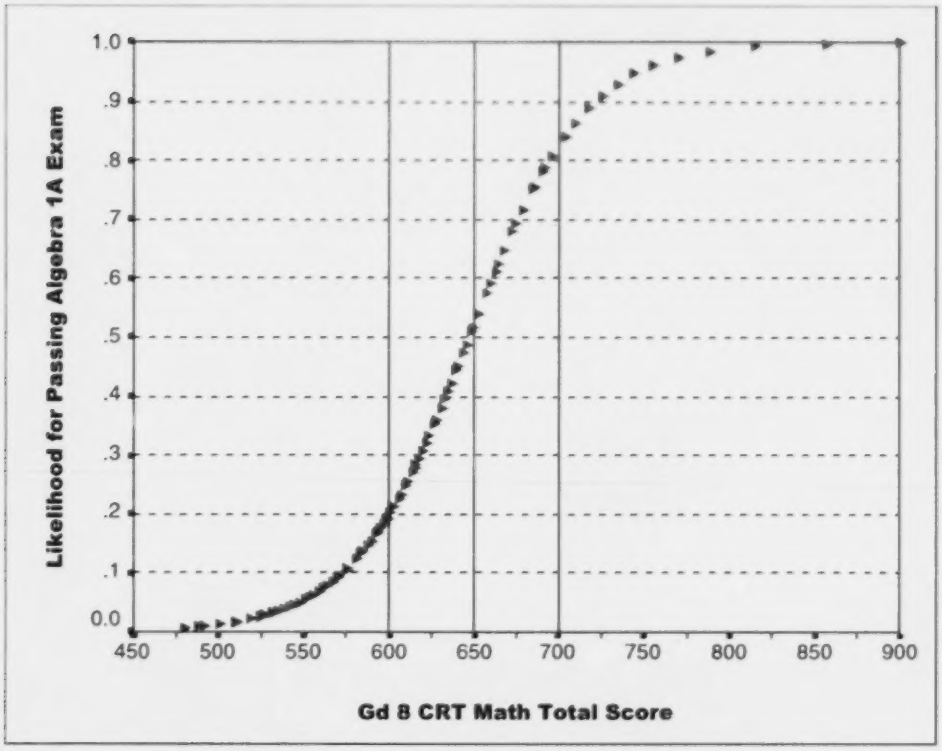
ATTACHMENT 2
White and Asian Students Were More Likely to Pass the Algebra 1A Exam Than Were African American or Hispanic Students with Similar CRT Math Scores From Grade 8

ATTACHMENT 3
Listing of Algebra 1A Teachers Without Math Certification In Regular High Schools.

ATTACHMENT 4
Teacher Preparation and Background, by School.

ATTACHMENT 1

The Likelihood for Students To Pass the Algebra 1A Exam in Grade 9 is Closely Related To Students' Math Performance in Grade 8



The curved line in Attachment 1 shows the average Algebra 1A exam passing rate among students with different CRT Math scores from eighth grade. This line does not establish a cut-off score below which students should be excluded from algebra instruction. However, this line suggests that the instructional and learning challenges confronting teachers and students increase among algebra students who are less prepared in math. Since the line represents an <u>average</u> passing rate, there are some students with low CRT scores who, by virtue of more effective instruction and motivation, experience success on the Algebra 1A exam.

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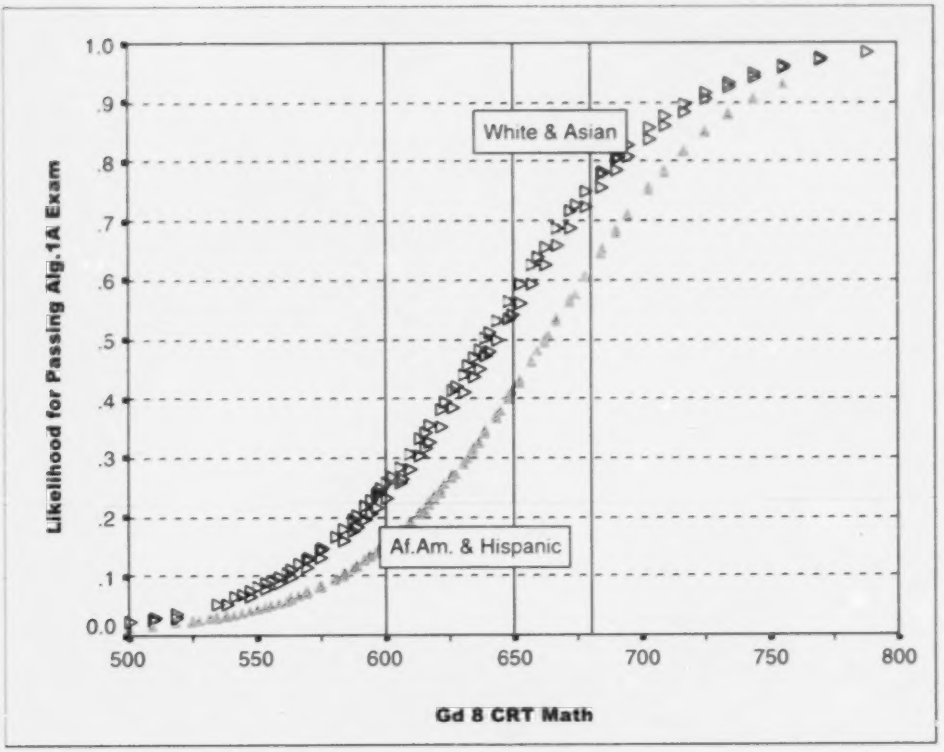
ATTACHMENT 2

White and Asian Students Were More Likely to Pass the Algebra 1A Exam
Than Were African American or Hispanic Students with Similar
CRT Math Scores From Grade 8



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ATTACHMENT 3

Listing of Algebra 1A Teachers Without Math Certification In Regular High Schools.

	School Code	No. of Tchrs.	Total Students	Years Teaching	Educ. Level	Sp.Ed. Tchr	% SpEd	% Gd.9	% Passed Exam	Average CRT Math Gd. 8
QUINCE ORCHARD HS	125	1	26	16-24	MA	Y	88%	42%	77%	559
POOLESVILLE HS	152	1	19	6-9	MA	Y	26%	32%	0%	563
R. MONTGOMERY HS	201	1	36	3-4	BA		11%	6%	36%	585
R. MONTGOMERY HS	201	1	11	2-3	MA	Y	82%	27%	0%	574
R. MONTGOMERY HS	201	1	21	10-15	MA	Y	67%	14%	19%	569
NORTHWEST HS	246	1	15	1	BA	Y	87%	47%	0%	560
PAINT BRANCH HS	315	1	11	16-24	MA	Y	100%	36%	9%	539
J. HUBERT BLAKE HS	321	1	20	3-4	MA+ or PhD		0%	100%	15%	647
B.C.C. HS	406	1	15	16-24	MA+ or PhD	Y	80%	7%	0%	573
WALTER JOHNSON HS	424	1	12	25 - +	MA	Y	100%	42%	8%	576
WHITMAN HS	427	1	15	25 - +	MA	Y	67%	27%	7%	585
SHERWOOD HS	503	1	26	1	MA	Y	46%	19%	8%	576
WATKINS MILL HS	545	1	25	16-24	MA	Y	80%	24%	70%	570
GAITHERSBURG HS	551	1	26	25 - +	MA+ or PhD	Y	69%	27%	12%	570
CHURCHILL HS	602	1	38	2-3	BA		3%	89%	68%	674
WHEATON HS	782	1	14	2-3	MA+ or PhD		14%	14%	0%	579
EINSTEIN HS	789	1	50	10-15	MA+ or PhD		4%	64%	10%	595
EINSTEIN HS	789	1	11	25 - +	MA+ or PhD	Y	73%	27%	0%	554
SPRINGBROOK HS	798	1	17	2-3	MA	Y	50%	41%	19%	560
SPRINGBROOK HS	798	1	38	2-3	MA		11%	87%	26%	619
KENNEDY HS	815	1	17	3-4	MA	Y	82%	53%	24%	559
KENNEDY HS	815	1	11	16-24	MA+ or PhD	Y	100%	64%	0%	551
School Summary						73% "Yes"	56%	40%	19%	579

NOTES: Small classes of less than 10 excluded. The last four columns summarize data for the teacher's case-load shown in the "Total Students" column. Total students refers to all students in all of the teacher's classes.

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ATTACHMENT 4

Teacher Preparation and Background by School
Data Include Teachers With Case-loads of At Least 10 Students
Algebra 1A, January 2000

	TEACHERS	Math Certified	Inservice MA65 or 66	Educ. Level			Years Experience			
				BA	MA	MA+ or PhD	1 - 3	3 - 9	10 - 24	25 +
	No. of Teachers	% Certif.	% Trained	% of Teachers	% of Teachers	% of Teachers	% of Teachers	% of Teachers	% of Teachers	% of Teachers
B.C.C. HS	5	100%	20%	20%	60%	20%	40%	20%	20%	20%
M. BLAIR HS	13	100%	31%	17%	67%	17%	42%	17%	33%	8%
J. HUBERT BLAKE HS	7	83%	14%	17%	50%	33%	33%	33%	17%	17%
CHURCHILL HS	6	83%	0%	33%	50%	17%	33%	50%		17%
DAMASCUS HS	11	100%	0%	40%	60%		40%	20%	20%	20%
EINSTEIN HS	8	86%	13%	29%	43%	29%	29%	29%	29%	14%
GAITHERSBURG HS	10	100%	0%	10%	60%	30%	20%	50%	20%	10%
WALTER JOHNSON HS	5	100%	0%	20%	80%		20%	60%		20%
KENNEDY HS	6	100%	17%	50%	33%	17%	67%		33%	
MAGRUDER HS	8	100%	38%	38%	38%	25%	38%	38%		25%
R. MONTGOMERY HS	7	86%	0%	43%	43%	14%	57%	29%	14%	
NORTHWEST HS	4	100%	50%		50%	50%		50%		50%
PAINT BRANCH HS	4	100%	25%	25%		75%	25%		25%	50%
POOLESVILLE HS	4	75%	0%		75%	25%		25%	50%	25%
QUINCE ORCHARD HS	7	100%	43%	50%	33%	17%	33%	33%	17%	17%
ROCKVILLE HS	7	100%	29%	14%	43%	43%		29%	43%	29%
SENECA VALLEY HS	8	100%	50%	25%	38%	38%	13%	25%	38%	25%
SHERWOOD HS	8	88%	0%	25%	63%	13%	38%	13%	38%	13%
SPRINGBROOK HS	10	89%	30%	22%	56%	22%	22%	44%	11%	22%
WATKINS MILL HS	6	100%	0%	17%	33%	50%	33%	17%	33%	17%
WHEATON HS	9	89%	11%		56%	44%	33%	22%	33%	11%
WHITMAN HS	8	100%	0%	14%	29%	57%	14%	29%	29%	29%
WOOTTON HS	8	100%	13%	29%	43%	29%	14%	43%	14%	29%
TOTAL	169	95%	17%	24%	49%	27%	29%	29%	23%	19%